

POLITECNICO DI TORINO
SECOND SCHOOL OF ARCHITECTURE
Master of Science in Architecture
Honors theses

Functional complexity and fluidity of forms in architecture. The virtual project in the preliminary project of an intermodal connection node in Novara

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During last years, architecture was influenced by a paradigmatic revolution, caused by affirmation of information society, by the use of new computer technologies, by the purpose of scientific world to reach a greater knowledge sharing, by the analysis in a positive projection of concepts such as chaos, disorder, catastrophe, always conceived with a negative connotation.

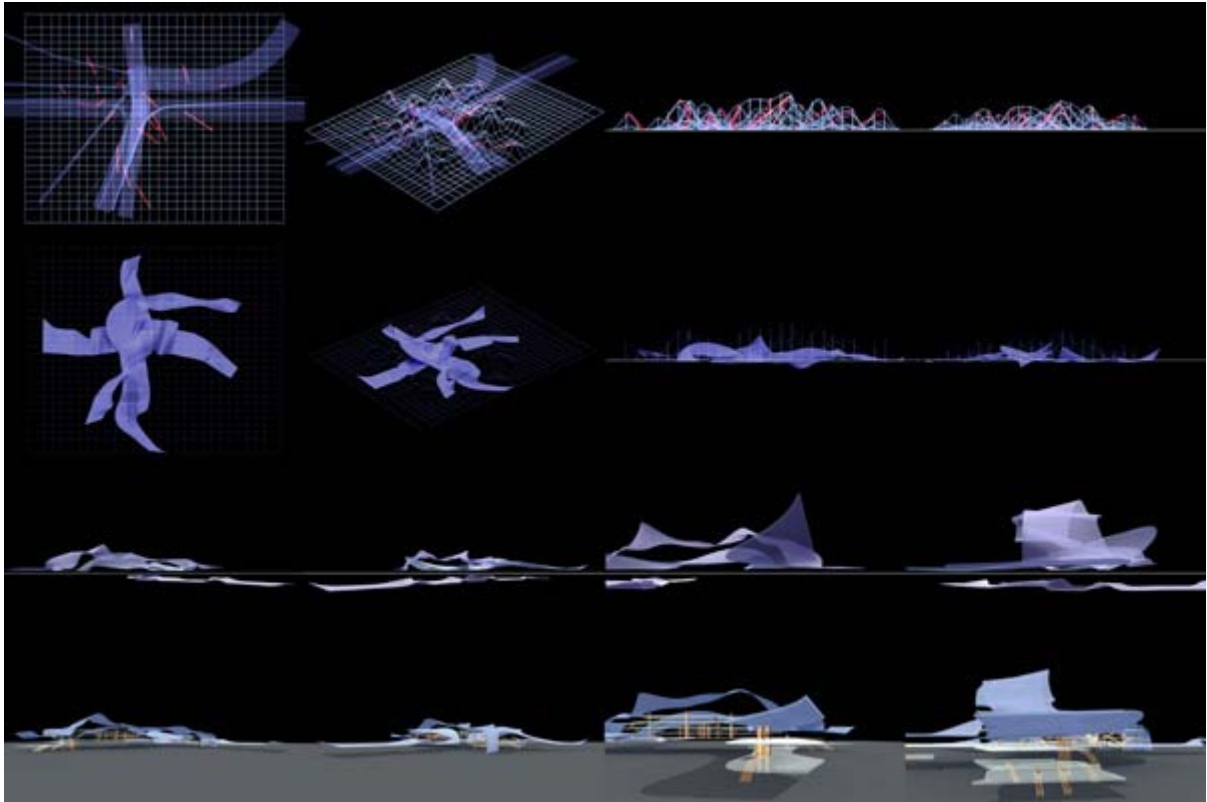
The first part of thesis work explains some notions about the transversal topic of *complex system* (which includes all those notions), offering terminological explanations, defining complexity characteristics and analyzing several studies of various disciplines to this theory.

Then, theoretical examination focuses about influence of complexity in architecture, analyzing the work of some architects who re-invented the concepts of chaos, catastrophe, disorder, flow, fluidity, metamorphosis: using the most recent design software, they explored new creative potentialities offered by these instruments, revolutionizing the geometrical and formal bases inherited by classical culture.

New concepts which come out from the theoretical part of the thesis are verified in a direct experimental application, that is the project of an architectural object which has intrinsic factors of a high complexity level: *the intermodal connection node*, whose preliminary studies were furnished by a personal participation in an interdisciplinary project of Alta Scuola Politecnica about the intermodal connection in Novara, where we can find the intersection of 5th High Speed Logistic Corridor, 24th High Speed Logistic Corridor and local railway line to Malpensa, with a particular attention to management, logistic and functional problems.

The experimental project finds its roots in the concept of flow, previously investigated in the complex systems analysis: in the intermodal connection node, flows are not only travellers' flows but they are also caused by some functions which are planned in the same area.

Flows analytical bases allowed to deeply understand the interlacement of physical and functional complexities: the virtual guide of this project is referable to the *diagrams method* by Peter Eisenman (analytical, conceptual and project).

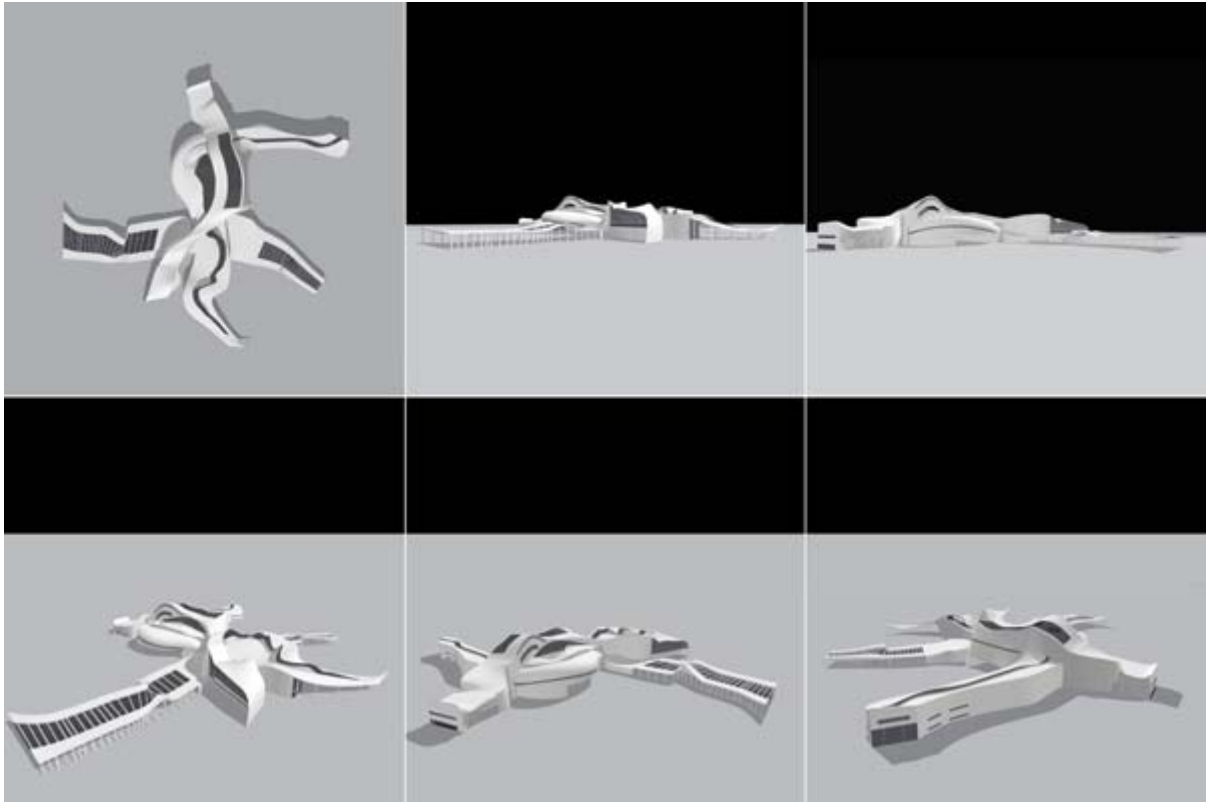


Representation of the overlap of conceptual diagrams, of their deformation using morphing, of first spatial configurations and of first studies about vertical connections

The first analytical diagrams represent the planimetric configuration of flows, whose dimension is referable to their numerical quantification; then, a conceptual diagram referring to new chaotic mathematics theories (Lorenz), opportunely codified by a N.U.R.B.S. design software, has been overlapped to the first one.

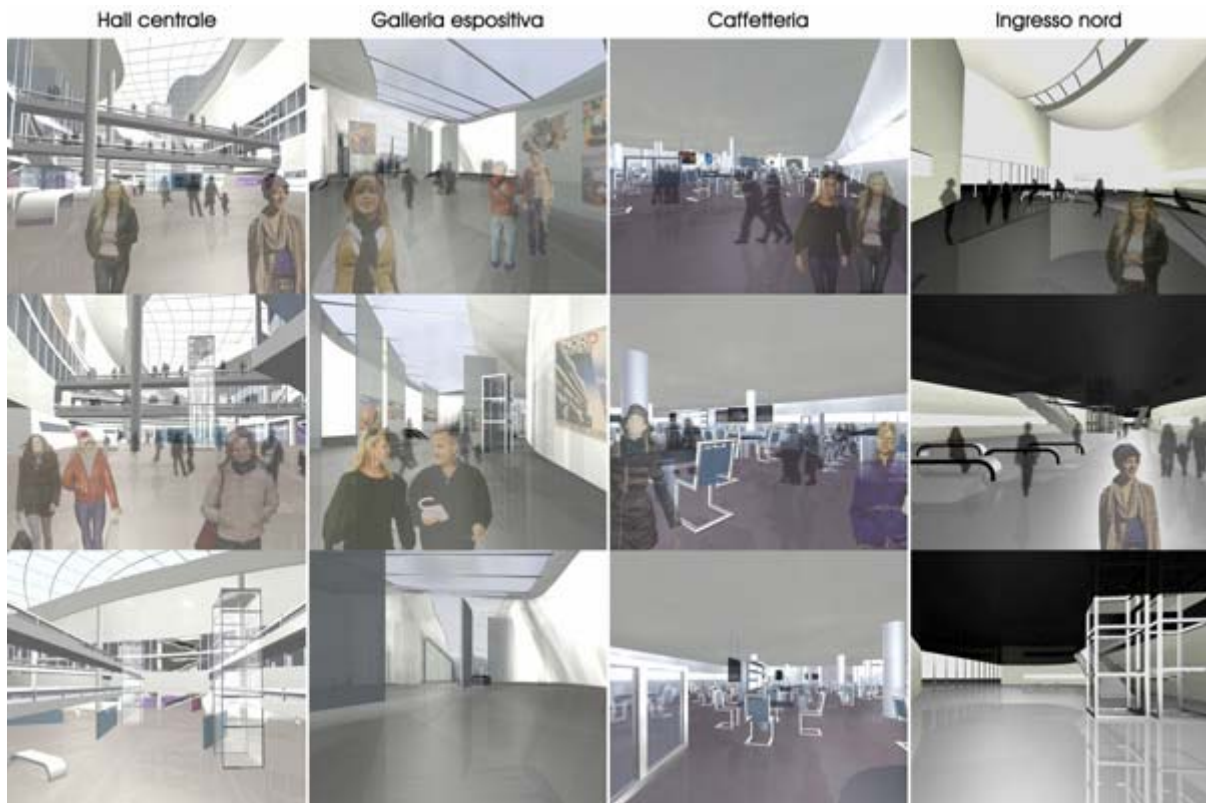
From different overlaps, an aware deformation process modifies diagrams thanks to *morphing* technique: then, the attention focuses about first vertical connections and first functions distributions.

Several studies about volume configuration were made using virtual monochromatic opaque models; in a second time, they were dematerialized in some parts using glass elements.



Planimetrical and perspective representations of the final model

From the external space, virtual observation points were moved in the internal space of the model, individuating five significant nodes of the project, with important spatial and formal configuration and vital functions: the expositive gallery, the coffee bar, one of the most important access, the central hall and High Speed railway access. From this kind of perceptive investigation of internal space, some changes of virtual model come out, trying to understand the correct use of natural light and the most appropriate internal partitions.



Virtual elaborations of some perspective views of the most important internal nodes

All the project's phases are completed using only virtual instruments, with the purpose to experiment a new project method able to manage intrinsic complexity of the intermodal connection node; this method recognizes in the virtual elaboration and in all possibilities offered by new computer technologies a way to understand, to modify, to delineate and to master architectural forms and spaces with a high level of complexity.

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